STRANDS AND STANDARDS

ELECTRICIAN 2

Course Description
A program with a sequence of courses that prepares individuals to apply technical knowledge and skills to assemble, install, operate, maintain, and repair electrically energized systems, such as residential, commercial, industrial electric-power systems wiring, D.C. and A.C. motors, controls, and electrical distribution panels. Includes instruction in the use of advanced technology test equipment.

<table>
<thead>
<tr>
<th>Intended Grade Level</th>
<th>10-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units of Credit</td>
<td>0.5</td>
</tr>
<tr>
<td>Core Code</td>
<td>40.08.00.00.055</td>
</tr>
<tr>
<td>Concurrent Enrollment Core Code</td>
<td>N/A</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>Electrician 1</td>
</tr>
<tr>
<td>Skill Certification Test Number</td>
<td>N/A</td>
</tr>
<tr>
<td>Test Weight</td>
<td>N/A</td>
</tr>
<tr>
<td>License Type</td>
<td>CTE and/or Secondary Education 6-12</td>
</tr>
<tr>
<td>Required Endorsement(s)</td>
<td></td>
</tr>
<tr>
<td>Endorsement 1</td>
<td>Electrician</td>
</tr>
<tr>
<td>Endorsement 2</td>
<td>N/A</td>
</tr>
<tr>
<td>Endorsement 3</td>
<td>N/A</td>
</tr>
</tbody>
</table>

CTE Learning that works for Utah

ADA Compliant: August 2018
STRAND 1
Students will be able to understand electrical safety.

Standard 1
Demonstrate safe working procedures in a construction environment.

Standard 2
Explain the purpose of OSHA and how it promotes safety on the job.

Standard 3
Identify electrical hazards and how to avoid or minimize them in the workplace.

Standard 4
Explain safety issues concerning lockout/tagout procedures, personal protection using assured grounding and isolation programs, confirm space entry and fall protection systems.

Performance Skill
Understand electrical safety.
- Demonstrate safe working procedures in a construction environment.
- Explain the purpose of OSHA and how it promotes safety on the job.
- Identify electrical hazards and how to avoid or minimize them in the workplace.
- Explain safety issues concerning lockout/tagout procedures, personal protection using assured grounding and isolation programs, confirm space entry and fall protection systems.

STRAND 2
Students will be able to understand hand bending.

Standard 1
Identify the methods of hand bending conduit.

Standard 2
Identify the various methods used to install conduit.

Standard 3
Use math formulas to determine conduit bends.

Standard 4
Mark 90-degree bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.

Performance Skill
Understand and demonstrate hand bending.
- Identify the methods of hand bending conduit.
- Identify the various methods used to install conduit.
• Use math formulas to determine conduit bends.
• Mark 90-degree bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.

STRAND 3
Students will be able to understand fasteners and anchors.

Standard 1
Identify and explain the use of anchors.

Standard 2
Demonstrate the correct applications for fasteners and anchors.

Performance Skill
Understand the application of fasteners and anchors.
• Identify and explain the use of anchors.
• Demonstrate the correct applications for fasteners and anchors.

STRAND 4
Students will be able to understand electrical theory.

Standard 1
Explain the basic characteristics of a series circuit.

Standard 2
Explain the basic characteristics of a parallel circuit.

Standard 3
Explain the basic characteristics of a series parallel circuit.

Standard 4
Calculate, using Kirchoff’s Current Law, the total current in parallel and series circuits.

Standard 5
Find the total amount of resistance in a series circuit.

Standard 6
Find the total amount of resistance in a parallel circuit.

Standard 7
Find the total amount of resistance in a series-parallel circuit.

Performance Skill
Understand and apply electrical theory.
• Explain the basic characteristics of a series circuit.
• Explain the basic characteristics of a parallel circuit.
• Explain the basic characteristics of a series parallel circuit.
• Calculate, using Kirchoff’s Current Law, the total current in parallel and series circuits.
• Find the total amount of resistance in a series circuit.
• Find the total amount of resistance in a parallel circuit.
• Find the total amount of resistance in a series-parallel circuit.

**STRAND 5**
Students will be able to understand electrical test equipment.

**Standard 1**
Explain the operation of and describe the following pieces of test equipment:
• Ammeter
• Volt meter
• Ohm meter
• Volt-ohm meter (VOM)
• Continuity tester
• Voltage tester

**Standard 2**
Explain the importance of proper meter polarity.

**Standard 3**
Explain the difference between digital and analog meters.

**Performance Skill**
Understand and demonstrate electrical test equipment.
• Explain the operation of specified test equipment.
• Explain the importance of proper meter polarity.
• Explain the difference between digital and analog meters.

**STRAND 6**
Students will be able to understand Introduction to the National Electrical Code.

**Standard 1**
Explain the purpose and history of the National Electric Code (NEC).

**Standard 2**
Describe the layout of the NEC.

**Standard 3**
Explain how to navigate the NEC.
Standard 4
Describe the purpose of the National Electrical Manufacturers’ Association (NEMA) and the National Fire Protection Association (NFPA).

Standard 5
Explain the role of testing laboratories.

Performance Skill
Identify the National Electrical Code.
- Explain the purpose and history of the National Electric Code (NEC).
- Describe the layout of the NEC.
- Explain how to navigate the NEC.
- Describe the purpose of the National Electrical Manufacturers’ Association (NEMA) and the National Fire Protection Association (NFPA).
- Explain the role of testing laboratories.

STRAND 7
Students will be able to understand raceways, boxes, and fittings.

Standard 1
Identify and select various types and sizes of raceways.

Standard 2
Identify and select various types of raceway fittings.

Standard 3
Identify various methods used to install raceways.

Standard 4
Demonstrate knowledge of NEC raceway requirements.

Standard 5
Describe procedures for installing raceways and boxes on drywall surfaces.

Standard 6
Recognize safety precautions that must be followed when working with boxes and raceways.

Performance Skill
Understand the application of raceways, boxes, and fittings.
- Identify and select various types and sizes of raceways.
- Identify and select various types of raceway fittings.
- Identify various methods used to install raceways.
- Demonstrate knowledge of NEC raceway requirements.
- Describe procedures for installing raceways and boxes on drywall surfaces.
- Recognize safety precautions that must be followed when working with boxes and raceways.

**STRAND 8**

**Students will be able to understand conductors.**

**Standard 1**
Explain the various sizes and gauges of wire in accordance with American Wire Gauge Standards.

**Standard 2**
Identify insulation and jacket types according to conditions and applications.

**Standard 3**
Describe voltage ratings of conductors and cables.

**Standard 4**
Read and identify markings on conductors and cables.

**Standard 5**
Use the tables in NEC to determine the ampacity of a conductor.

**Standard 6**
State the purpose of stranded wire.

**Standard 7**
Describe the different materials from which conductors are made.

**Standard 8**
Describe the different types of conductor insulation.

**Standard 9**
Describe the color coding of insulation.

**Standard 10**
Describe the procedure for pulling wire through conduit.

**Standard 11**
Install conductors in conduit.

**Standard 12**
Pull conductors in a conduit system.
Performance Skill
Understand and how to apply conductors in a safe way.

- Explain the various sizes and gauges of wire in accordance with American Wire Gauge Standards.
- Identify insulation and jacket types according to conditions and applications.
- Describe voltage ratings of conductors and cables.
- Read and identify markings on conductors and cables.
- Use the tables in NEC to determine the ampacity of a conductor.
- State the purpose of stranded wire.
- Describe the different materials from which conductors are made.
- Describe the different types of conductor insulation.
- Describe the color coding of insulation.
- Describe the procedure for pulling wire through conduit.
- Install conductors in conduit.
- Pull conductors in a conduit system.

STRAND 9
Students will be able to understand the application of boxes, fittings, and fixtures.

Standard 1
Describe the different types of nonmetallic and metallic boxes.

Standard 2
Properly locate, install, and support boxes of all types.

Standard 3
Understand the NEC requirements for boxes supporting light fixtures.

Standard 4
Install the different types of fittings used in conjunction with boxes.

Standard 5
Explain how boxes and fittings are selected and installed.

Standard 6
Describe the various types of box supports.

STRAND 10
Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 2.
Standard 1
Understand and demonstrate reliability.
- Determine individual time management skills.
- Explore what’s ethical in the workplace or school.
- Demonstrate awareness of government.
- Demonstrate awareness of professional organizations and trade unions.

Standard 2
Understand and demonstrate responsiveness.
- Define the customer.
- Recognize benefits of doing a community service project.
- Demonstrate social etiquette.
- Identify customer expectations.

Standard 3
Understand resiliency.
- Discover self-motivation techniques and establish short-term goals.
- Select characters of a positive image.
- Identify a mentor.

Standard 4
Understand and demonstrate workplace habits.
- Participate in a shadowing activity.
- Explore workplace ethics: codes of conduct.
- Recognize safety issues.
- Perform a skill demonstration.
- Exercise your right to know.

Standard 5
Understand and develop initiative.
- Develop personal financial skills.
- Develop a business plan.
- Investigate entrepreneurship opportunities.

Standard 6
Understand and demonstrate continuous improvement.
- Conduct a worker interview.
- Demonstrate evaluation skills.
- Examine ethics and values in the workplace.
- Develop a working relationship with a mentor.
- Construct a job search network.